## DETAILED ACTION

Papers Received

1. The Amendment and Remarks filed 12/02/2009 are acknowledged and have been entered.

- Applicants' request a new Office Action because claim 17 was omitted from the examiner's previous action. Claim 17 was not addressed; the examiner apologies for this oversight.
- A new Office Action follows.

***Election of Invention***

2. Applicant's election of Group II method invention without traverse 12/18/08 is again acknowledged. With instant claims the elected method invention is in claims 11-17, the elected invention no longer dependant on the non-elected linking invention claim 1. In event of rejoinder, product claims may be rejoined and fully examined for patentability in accordance with 37 CFR 1.104 and to be allowable the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until claims are found allowable this otherwise proper restriction requirement may be maintained, claims not commensurate in scope with allowable claims will not be rejoined. MPEP 821.04(b).

3. Claims drawn to elected invention under consideration are 11 to 17.

Statuary basis

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Rejections

5. Claims 11-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over **Onoda et al** (JA 2002-220259) with either **Miyamoto et al** (JA 2001-167427 or US 2002/0110706) - either in further view of **Isono et al** (US 2005/0284179).

**Onoda et al** is directed to a magnetic glass disk method of manufacture. In **Onoda et al** the magnetic disk with glass substrate has opposing surface compressive stress layers within the claimed thickness (**Onoda et al** ¶[0036]). **Onoda et al** uses the same compressive stress strengthening process sequence as applicant (*cf* instant specification ¶[0079-83] pg 19-20 with **Onoda et al** ¶[0014], [0030]) so would reasonably be expected to be the same or nearly so. The claimed stress is only limited by any range 'predetermined' in the method claims under consideration, impact resistance is similarly without numeric limitation and only limited by any range 'predetermined' in the method claims and waviness is likewise only limited by any range 'predetermined' in the method claims. The worker of ordinary skill would reasonably have been expected to have something as a predetermined degree in manufacturing a commercial disk, meeting the breadth claimed for the method is carried out. **Onoda et al** teaches routine adjustments to a degree to make the disk useable in a drive system

(**Onoda et al** ¶[0017], [0023] and [0031]), commensurate with acceptable noise and distortion levels (**Onoda et al** ¶[0028]).

**Onoda et al** does not specify finishing to *mirror* degree or measure *waviness* for the disks produced in their method. However *mirror finishing* and *waviness* are disk conventions routinely optimized with quality checks in the manufacture of commercial magnetic recording substrates as evident from **Miyamoto et al** (JA) showing an showing further steps for to smooth disk finish and acceptable stress tolerance - **Miyamoto et al** (JA) ¶[0031] waviness ¶[0045] and finish ¶[0046]; waviness as a disk variation tolerances ¶[0078], [0098], [0113], [0264], [0271]) and mirror-finishing polishing as smoothness degree adjustments ¶[0099], [0172-0174] and **Miyamoto et al** (US) stress and depth tolerance levels ¶[0268])

The claims require measure with specific *Babinet* compensator; however it is not seen how the compensator instrument itself would change/effect the measure in the art since the art teaches measuring to the same degree applicants' claim. It would be obvious to one having ordinary skill in the art to adopt the tolerances and measures shown for media disks in **Miyamoto et al** (JA) and **Miyamoto et al** (US) in **Onoda et al** disk manufacture for low fly head systems, these are similarly taught in **Miyamoto et al** (JA) at ¶[0005] and **Miyamoto et al** (US) at ¶[0010-0015] and [0058].

The claims include ' . . . *wherein the melted glass mixture having three alkali metal nitrates . . .* ' where the smallest ion radius alkali metal nitrate is 0.0001% to 0.3% by volume, the smallest ion radius *alkali metal nitrate* corresponds to

*Lithium Nitrate*. **Isono et al** similarly teaches strengthened glass with a layer of having three *alkali metal nitrates* where the smallest ion radius *alkali metal nitrate* is 0.0001% to 0.3% by volume (**Isono et al** ¶[0093]-[0099]), encompassing in the specific examples in ratio as summarized at TABLE 1 at **Isono et al** ¶[0095]. It would have been obvious to one having ordinary to adopt the **Isono et al** strengthened glass with a layer of having three *alkali metal nitrates* where the smallest ion radius *alkali metal nitrate* in glass disk of **Onoda et al** with **Miyamoto et al** for increased toughness and shock resistant disks (**Isono et al** ¶[0009]).

- As regards claim 11 **Onoda et al** teaches chemically strengthening by bringing the glass substrate into contact with a three nitrites (**Onoda et al** ¶[0011-13] to form compressive stress layers at both opposed 'main surfaces' of the glass - this is evident from the glass substrate immersed in the strengthening at ¶[0047] – e.g., specific Examples 1 and 3 to 5. The ion exchange is considered low-temperature ion exchange, though applicants offer no standards for low, but no heating steps in **Onoda et al** ¶[0037], [0014] would be a reasonable interpretation. A modified region over between the glass and compression layers would reasonably be expected transitioning tensile stress extent between the compressive stress layers and main surface, see **Miyamoto et al** (JA) at ¶[0015], [0030], and [0041].

- As regards claim 12 polishing see **Onoda et al** ¶[0047] & Examples 1, 3 through 5; **Miyamoto et al** (JA) at ¶[0053] and **Miyamoto et al** (US) at ¶[0075], [0181-182].
- As regards claim 13 the mirror-finished surfaces have an arithmetic mean roughness ($R_a$) 0.4 nm or less see **Miyamoto et al** (JA) ¶[0046]; **Miyamoto et al** (US) *mirror* finish see roughness ¶[0058], [0062], [0099], [0172-174] considered within a *mirror* finish degree.
- As regards claim 14 see **Onoda et al** ¶[0044]; **Miyamoto et al** (JA) at ¶[0053]; **Miyamoto et al** (US) at ¶[0217] et seq.
- As regards claim 15 see TABLE 1 in **Isono et al** ¶[0095].
- As regards claim 16 ppm range see TABLE 1 of **Isono et al** ¶[0095], and Table 1 range would be expected to encompass the 10-3000ppm range given the presence of *Li* ranging 2 weight percent of *nitrate* ratio.
- As regards claim 17 *aluminosilicate* glass see **Miyamoto et al** (JA 2001-167427 ¶[0051], and **Isono et al** ¶[0040], [0043], [0051], [0054], and **Miyamoto et al** (US) ¶[0126-0128], [146], [0167], [0245], and [0256].

*Comments on antedating references*

6. Applicant's claim for the benefit of prior-filed US Provisional Application 60/556,021 has been acknowledged, conditions for receiving the benefit of an earlier filed date under 37 CFR 1.78a,5(iv)1, including a certified English translation, have not been complied.

7. Applicant's request for a new action to replace the final action dated 09/02/2009 and entry of all amendments after final rejection based on the examiners not addressing claim 17 has been completed with this action, all amendments after final rejection have been entered.

Amendments

Applicant's Amendments necessitated the new grounds of rejection over **Isono et al** in the previous and the instant Office action. Applicant's arguments with respect to the method claims under consideration have been fully considered

8. Applicants argue

**Claim 11**

The present invention recited in claim 11 relates to a method for manufacturing a magnetic disk glass substrate for use in a hard disk drive and having a disk thickness of less than 0.5 mm and mirror-finished main surfaces. Thus, the magnetic disk glass according to the present invention is suitably used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses.

Furthermore, according to the present invention recited in claim 11, the melted mixture of at least three alkali metal nitrates contains 0.001% to 0.3% by volume of a nitrate of alkali metal having a smallest ion radius among the alkali metal nitrates so as to satisfy both high impact resistance and low waviness (Wa).

These are features of the present invention recited in claim 11. None of the cited references discloses or suggests these features.

- In response the thickness limitation is not present in the body of claim 11:

11. (Previously Presented) A method for manufacturing a magnetic disk glass substrate or use in a hard disk drive and having a disk thickness of less than 0.5 mm and mirror-finished nain surfaces, the glass substrate comprising:

The ' *... thickness less than 0.5 mm ...* ' appears only in the preamble not as a limitation on the disk structure in the body of the claim and has not been treated as a patentably distinguishing limitation in the method. In addition the prior art processes appear capable of size scaling to magnetic recording drives since these all produce disks for magnetic recording media and prior art methods have not been shown to perform differently.

- In further reply **Isono et al** has been shown to similarly produce strengthened glass disks using the same three *alkali metal nitrates* encompassing in the specific examples in ratio as summarized at TABLE 1 and ¶[0093]-[0099]¶[0095] the 0.0001% to 0.3% by volume. Applicants have not demonstrated 0.0001% to 0.3% by volume as beyond routine optimization over **Isono et al**.

9. Claims11 to 17 drawn to elected invention have been considered. No claim has been allowed in this action.

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

INQUIRES

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Louis Falasco, whose telephone number is (571)272-1507. The examiner can normally be reached on M-F 10:30 - 7:00.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached at (571)272-1291. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/L. F./
Examiner, Art Unit 1794

/Kevin M Bernatz/
Primary Examiner, Art Unit 1794

December 7, 2009